SPECIFICATION

TITLE

"MOLDABLE CONTAINER WITH BULGING SIDES AND FEET"

FIELD OF THE INVENTION

The present invention generally relates to shallow bowl-shaped containers. More specifically, the invention relates to shallow bowl-shaped containers that are blow molded, injection blow molded or injection molded. Additionally, the invention relates to methods for hot-filling and retorting such containers.

BACKGROUND OF THE INVENTION

Shallow molded containers are known. However, molded containers having bulging sides are not known because it is difficult to extract such a container in an axial direction from the mold because of engagement of the bulging sides against portions of the mold that correspond to the upper or lower portions of the container body.

Further, molded containers having individual "feet" are not commonly known for containers other than pressure vessels for soft drinks. Instead, prior art molded containers typically employ a circular standing ridge in place of individual feet because it is difficult to mold plastic containers having feet. Yet individual feet can be preferred over a standing ridge because three individual feet can impart improved stability to a container when in use because the possibility of the container rocking is reduced or eliminated.

Still further, although plastic hot-fill containers and plastic retort containers are known, they are configured to be deformable or to include expansion members to accommodate volumetric changes of the contents during cooling of a hot-fill container or during heating of a retort container. As a result, rigid containers for hot-fill and retort applications are not generally available.

Also, consumer demand requires that new product designs and shapes be constantly developed. This demand also applies to containers. As a result, there is a need for a moldable container with bulging sides because such a container would be different in configuration than prior art molded containers and could be used to distinguish the products sold in such containers from competing products. Further, there is a need for molded containers having feet as opposed to circular standing ridges to present a container with a new look or appearance. Still further, there is a need for molded containers having unique designs that are both rigid and suitable for hot-fill and retort processing.

SUMMARY OF THE INVENTION

The above needs are inventively met by the present invention which provides a plastic molded container having bulging sides with or without supporting feet. Further, the present invention provides a method of making such a container. Finally, the present invention provides such a container suitable for hot-filling and retorting.

To these ends, in an embodiment, the present invention provides a plastic molded container that comprises a bowl which comprises an upper rim, a bottom and a sidewall that extends between the upper rim and the bottom. The sidewall extends radially outwardly before extending radially inwardly as the sidewall extends downward between the upper rim and the bottom to provide a bulging sidewall.

In an embodiment, the bowl further comprises a plurality of feet formed along the bottom as deformations of the bottom.

In an embodiment, immediately below the upper rim, the sidewall extends radially inwardly to form a substantially flat surface that extends radially inwardly at an angle to form a grip before the sidewall extends radially outwardly before extending radially inwardly again as the sidewall extends downward towards the bottom.

In an embodiment, the plurality of feet comprises at least three feet. In such an embodiment, the three feet can comprise a first foot that extends along a radius of the bowl as viewed from the bottom thereof and a second foot and a third foot which extend in opposite directions and perpendicular to the radius along which the first foot extends. In such an embodiment, the radius along which the first foot extends can be a mold parting line.

In an embodiment, the plurality of feet can comprise at least four feet. In such an embodiment, the four feet can comprise a first pair of feet disposed on one side of a diameter of the bowl as viewed from the bottom thereof and a second pair of feet disposed on an opposing side of said diameter from the first feet. In such an embodiment, the first pair of feet may be disposed parallel to one another and the second pair of feet may be disposed parallel to one another. In a related embodiment, the at least four feet can comprise a first pair of feet disposed along a diameter of the bowl as viewed from the bottom thereof and a second pair of feet disposed on opposing sides of the diameter along which the first pair of feet are disposed. In such an embodiment, the second pair of feet may be colinear. In such an embodiment, the diameter may be a mold line.

In an embodiment, the container may further comprise a lid that is securable to the upper rim.

In an embodiment, the lid may be rotatably securable to the rim.

In an embodiment, the invention provides a blow-molded plastic bowl-shaped container having three feet unitarily formed with the container, one foot extending in a first radial direction, the other two feet extending in directions opposite to each other and perpendicular to the first direction.

In an embodiment, the feet are outward extensions of the wall of the bowl-shaped container. The feet can be elongated and tapered from the middle of the bowl portion to the outer periphery of the bowl portion.

In an embodiment, the container is molded from a plastic comprising at least one of the group consisting of polyvinylchloride, polyethyleneterephthalate, high density polyethylene, polycarbonate, polystyrene and polypropylene.

In an embodiment, the container is blow-molded from a single layer plastic.

In an embodiment, the container is blow-molded from plastic materials having a plurality of layers. In such an embodiment, the plastic may further comprise at least a barrier layer, such as an oxygen barrier layer, selected from the group consisting of polyvinylidienechloride, nylon, and ethlyenevinylalcohol copolymer. In addition, a barrier quality can be provided by spray coating the molded container. Plasma deposition may also be used to create a barrier layer. In addition to oxygen, such a barrier may also be intended for odors, solvents or other gases.

In an embodiment, the invention provides a method of forming a plastic container comprising the steps of: providing two mold halves, each mold half having a cavity defining one-half of the container comprising a bowl comprising an upper rim, a bottom and a sidewall extending between the upper rim and the bottom, the sidewall extending radially outwardly before extending radially inwardly as the sidewall extends downward between the upper rim and the bottom to provide a bulging sidewall; abutting the two mold halves together; blowing plastic material into the abutted mold halves under blow molding conditions; separating the mold halves; and extracting the resultant container.

In an embodiment, the present invention provides a method of forming a plastic container from a mold comprising more than two parts or halves, such as a three or four piece mold.

In an embodiment, the present invention comprises a method of hot-filling a container, comprising the steps of: providing a plastic container comprising a bowl comprising an upper rim, a bottom and a sidewall extending between the upper rim and the bottom, the sidewall extending radially outwardly before extending radially inwardly as the sidewall extends downward between the upper rim and the bottom to provide a bulging sidewall; positioning the container within a receptacle; filling the container with material under hot filling conditions; sealing the container with

a suitable seal member; and securing a lid on the container.

In an embodiment, the present invention comprises a method of retorting material disposed within a container, comprising the steps of: providing a plastic container comprising a bowl comprising an upper rim, a bottom and a sidewall extending between the upper rim and the bottom, the sidewall extending radially outwardly before extending radially inwardly as the sidewall extends downward between the upper rim and the bottom to provide a bulging sidewall; positioning the container within a receptacle; filling the container with material under ambient or near ambient conditions; sealing the container with a suitable seal member; securing a lid on the container; and heating the container, material, lid and seal member.

Other objects and advantages of the present invention will become apparent upon reading the following detailed description and appended claims, and upon reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, reference should now be made to the embodiments illustrated in greater detail in the accompanying drawings and described below by way of examples of the present invention.

Figure 1 illustrates in perspective bottom view a container embodying principles of the present invention;

Figure 2 illustrates in side elevational view a container embodying principles of the invention filled with product;

Figure 3A illustrates the container of Figure 1 in plan view schematically surrounded by mold halves illustrated by broken lines;

Figures 3B-3C illustrate schematically, in a bottom plan view, containers made in accordance with the present invention having four feet;

Figures 3D-3E illustrate schematically, in a bottom plan view, containers made in accordance with the present invention having six feet;

Figure 4 schematically illustrates the interior of a mold half and a compressed gas needle used to blow gas into the interior of a parison used to form the container of Figure 1; and

Figure 5 illustrates a side elevational view of the container of Figure 1 having a lid and screw thread top shown in phantom lines.

It should be understood that the drawings are not necessarily to scale and that the embodiments are sometimes illustrated by graphic symbols, phantom lines, diagrammatic representations and fragmentary views. In certain instances, details which are not necessary for an

understanding of the invention or which render other details difficult to perceive may have been omitted. It should be understood, of course, that the invention is not necessarily limited to the particular embodiments illustrated herein.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

As illustrated in Figures 1-3, a container 10 embodying principles of the invention includes a bowl portion 12, preferably shaped like a bean pot. Such a shape includes a bulging sidewall 14 which in cross section is arcuate in shape thereby to impart a lower belly 16 to the container 10. The sidewall 14 terminates in a neck portion 18, which in turn flares outwardly to form a grip 19 and terminates in an upper rim 20. The rim 20, in the embodiment illustrated in the figures, has a shoulder 22 which extends inwardly into the neck 24 of the container. As the sidewall 14 extends downwardly from the neck 18, it extends radially outwardly until it reaches a lower mid-point of the container 10 and then the sidewall 14 extends radially inwardly as shown to form the belly 16 before the sidewall 14 reaches the bottom 21.

As may be appreciated from the figures, the container 10 has "squat" proportions in which the largest-room sectional diameter of the bowl 12 (i.e., taken along a horizontal cross section) is larger or greater than the height of the bowl 12. In the illustrated embodiment, this diameter is greater than an overall height of the container 10 as measured from a bottom of the bowl 12 to a top of the rim 20.

Referring to Figure 4, in the presently preferred method for forming the container 10, a plastic material parison 26 is captured in a cavity 48 defined by two mold halves 28 and 29, and compressed gas is blown into the mold to force the material 26 against the walls of the cavity 48 defined in the mold halves 28 and 29. The container 10 is then formed in the normal manner with appropriate cooling steps, such as liquid cooling to set the shape of the plastic. When the container 10 is completed, the mold halves 28 and 29 are separated and the container 10 is ejected or released.

Blow molding is well known and reference can be made to United States Patents Nos. 4,457,855 and 4,990,382, which are incorporated herein by reference.

As illustrated, in Figure 4, as is known, a spin trim dome or a blow dome 30 can be formed to a top of the container 10. The dome 30 can then be removed during a further processing.

Further, each mold half 28 and 29 can further define a second cavity (not shown) for simultaneously molding a second container (not shown). The second cavity can be molded 180-degrees opposed to the first container 10 and connected to the first container across the dome 30. After extraction of the connected containers, the containers can be separated at the area comprising the dome 30 and the remnants of the dome removed from the respective containers.

The plastic material parison 26 can comprise a single layer plastic or a multi-layer plastic. The plastic can be chosen from any suitable material, including but not limited to polyvinylchloride, polyethyleneterephthalate, high density polyethylene, polycarbonate, polystyrene and polypropylene plastic materials which are particularly suited for containers 10 having cold fill food items. Further, a multi-layer plastic may be used which has a barrier layer, such as an oxygen barrier layer, comprising, for example, a material including, but not limited to polyvinylidienechloride, nylon, and ethlyenevinylalcohol copolymer. An oxygen barrier layer is particularly suited for containers 10 having oxygen sensitive food items. As mentioned previously, in addition, a barrier quality can be provided by spray coating the molded container. Plasma deposition may also be used to create a barrier layer. In addition to oxygen, such a barrier may also be intended for odors, solvents or other gases.

As illustrated, the resultant container 10 then has a mold parting line 32 along its underside at which the two mold halves 28 and 29 were abutted. This mold parting line 32 serves herein as a reference line against which further features of the container are described.

As also illustrated in Figure 3A, the container 10 may include three unitarily formed feet 34, 36 and 38. The feet 34, 36 and 38 essentially comprise deformed wall portions 14 of the container 10 formed by the pressure of blow-molding gas blown into the interior of the bowl portion 12 during its formation. Each foot 34, 36 and 38 is somewhat elongate and tapered from a back end 42 to a front end 40. The front ends 40 are those portions that face the outer periphery of the bowl portion 12, while the back ends 42 are those portions that face either the mold line 32 or a middle of the bowl portion 12, as viewed in plan view of Figure 3A. Figures 3B and 3C illustrate configurations of the container that include four feet 61-64 and 61a-64a respectively. Figures 3D and 3E illustrate embodiments which include six feet 65-70 and 65a-70a respectively.

Referring back to Figure 3A, one of the feet 34 is formed along the mold parting line 32 and thus each half 44 and 46 of the foot 34 is formed by a suitable cavity in a respective one of the mold halves 28 and 29. Each of the other feet 36 and 38 is completely formed by another suitable cavity in a respective one of the mold halves 28 and 29. As illustrated, the other feet 36 and 38 extend at a right angle to the first foot 34 and are positioned at a portion of the bottom of the container 10 opposite the outermost reach of the first foot 34. As illustrated in Figures 3C and 3E, the feet 62a, 64a of the four foot configuration shown in Figure 3C and the feet 67a, 70a of the six foot configuration shown in Figure 3E may also be formed along mold lines 71, 72 respectively.

The recessed neck 18 and grip 19 of the container 10 provides an area which is easy for a user to grip the container 10. The recessed neck portion 18 provides an indentation in which a normal

sized adult fingers can fit thereby enabling a more secure grip about the neck 18 as the neck 18 will be hindered from moving up or down relative to the fingers. This is particularly useful when the outside of container is wet, for example, due to sweating or condensation or when the container is hot.

Further, the sidewall 14 of the container 10 is preferably molded into a shape such that a number of containers 10a (not shown) and 10b (not shown) can be stacked one onto another. To this end, the front ends 40 of the feet 34, 36 and 38 of the first container 10a abut against an inside ridge formed into a top of a lid 50 on the second container 10b, the feet 34, 36 and 38 being hindered from lateral movement by the ridge on the lid 50.

Further, in one embodiment, it will be noted that the maximum radius of the sidewall 14 may be slightly greater than the maximum radius of the rim 20 or shoulder 22 or lid 50. This arrangement ensures that sidewalls 14 of adjacent containers 10 will engage one another without the lids 50 of adjacent containers 10 engaging one another when a plurality of containers are packed tightly together in a box or case.

The container 10 can be filled with any suitable material. In a preferred embodiment, the container 10 has a bowl-shaped wall, which is suitable for containing food products, such as, for example, salsa, beans, cheese, or sauces. The container 10 can be filled with material by a cold-fill or a hot-fill process. Further, the container 10 is also suitable for retort processes as well. The bowl is equally adaptable for or usable in such varied processes/applications because of the inherent integrity/sturdiness provided by the bowl's shape. With this shape, the walls resist paneling and other deformations even during a retort process in which items are first sealed in the container area then subjected to heating and then cooling.

After the container 10 is filled with material, the neck 24 of the container 10 can be sealed with a suitable sealing member such as a film or foil which is bonded to the neck portion 24. In the alternative, an overseal (not shown) can be placed over the lid 50. A tamper evident seal can then be formed over the neck portion 24 and secured thereto by the hot melt adhesive. The tamper evident seal can comprise any conventional sealing material, such as, for example, a single layer or multi-layer foil. A lid 50 can then be fitted over the sealing member and secured to the container 10.

For retort processes, the container 10 can be filled with material at an ambient temperature or an elevated temperature for materials where it is desired to reduce the viscosity of the material for handling or filling purposes.

Again, while a two mold formation has been discussed and shown, containers of this type can be made using more than two mold parts, e.g., three or four mold sections.

From the above description it is apparent that the objects of the present invention have been achieved. While only certain embodiments have been set forth, alternative embodiments and various modifications will be apparent from the above description to those skilled in the art. These and other alternatives are considered equivalents and within the spirit and scope of the present invention.